

Spadra Basin GSA – Staff Report



TO: Advisory Committee
FROM: Administrative Officer
DATE: April 5, 2021
SUBJECT: Technical Memorandum – Spadra Basin Monitoring Well Siting Study

■ Action/Discussion

■ Fiscal Impact

■ Resolution

■ Information Only

Recommendation

No action required

Background

The Spadra Basin GSA contracted West Yost to help prepare the GSP. As part of the development of the GSP, the work plan included a task to collect additional hydrogeological information by constructing a new monitoring well.

As part of this process, West Yost has completed the "Spadra Basin Monitoring Well Siting Study", which will be discussed in more detail at the meeting.

TECHNICAL MEMORANDUM

DATE: March 26, 2021

Project No.: 954-80-20-01

SENT VIA: EMAIL

TO: Spadra Basin Groundwater Sustainability Agency (GSA)

FROM: Spadra Basin GSA Engineer

REVIEWED BY: Andy Malone, PG

SUBJECT: Spadra Basin Monitoring Well Siting Study

BACKGROUND

The Walnut Valley Water District (WVWD) and the City of Pomona (Pomona) collectively formed a Groundwater Sustainability Agency (GSA) for the Spadra Basin (Spadra Basin GSA) to prepare and adopt a Groundwater Sustainability Plan (GSP) for the Spadra Basin pursuant to the Sustainable Groundwater Management Act of 2014 (SGMA). The Spadra GSA was awarded a Proposition 1 Sustainable Groundwater Planning Grant by the California Department of Water Resources (DWR) to fund in part the development of the GSP. The Work Plan in the Grant Application and Agreement (Agreement No. 4600012726) includes a task to collect additional hydrogeologic information by constructing a new monitoring well. The objective of this new monitoring well is to fill a data gap in the Spadra Basin that was identified when preparing the Spadra Basin hydrogeologic conceptual model and calibrating the Spadra Basin groundwater-flow model. The data collected from the monitoring well will include: borehole lithology, borehole geophysics, depth to the bottom of the aquifer, groundwater-level data, and groundwater-quality data.

This memorandum is a well-siting study that: identifies a “Target Area” for the new monitoring well based on the location of the data gap; describes criteria used to evaluate potential sites for the new monitoring well within the Target Area; identifies and ranks potential sites for the location of the monitoring well; describes general monitoring well design specifications; provides cost estimates for the construction and equipping of the monitoring well; and recommends next steps.

IDENTIFICATION OF THE TARGET AREA

The GSP Regulations require the identification of “data gaps” and levels of uncertainty in the description in the Basin Setting.¹ A data gap as defined in the GSP Regulations “refers to a lack of information that significantly affects the understanding of the Basin Setting or the evaluation of the efficacy of the GSP implementation, and could limit the ability to assess whether a basin is being sustainably managed.”

In January 2020, the Spadra Basin GSA completed *Technical Memorandum 1 – Conceptual Model of the Spadra Basin* (TM 1), which describes the “Plan Area” and “Basin Setting” of the Spadra Basin as required in *Article 5—Plan Contents* of the DWR’s GSP Regulations ([California Code of Regulations, Title 23, Division 2, Chapter 1.5, Subchapter 2](#)). The Basin Setting description was used to support (1) this effort for siting a new monitoring well to fill a data gap; (2) the construction and calibration of the numerical groundwater-flow model that will be used to develop and evaluate the GSP; and (3) the development of the Sustainable Management Criteria for the Spadra Basin.

In June 2020, the Spadra Basin GSA completed *Technical Memorandum 2 – Construction and Calibration of the Spadra Basin Groundwater Model* (TM 2), which describes the water budget of the Spadra Basin pursuant to the DWR’s GSP Regulations for the “Basin Setting” section of the GSP ([California Code of Regulations, Title 23, Division 2, Chapter 1.5, Subchapter 2, Article 5, Subarticle 2, §354.18](#)) and the construction and calibration of the numerical groundwater-flow model, which was performed consistent with the requirements in the DWR’s GSP Regulations ([California Code of Regulations, Title 23, Division 2, Chapter 1.5, Subchapter 2, Article 3, §352.4\[f\]](#)).

The results and findings of TM 1 and TM 2 include a description of data gaps and provide justification on the need for and location of a new monitoring well. Based on these results and findings the following criteria were developed and used to identify a Target Area for the new monitoring well that fills the data gaps identified in TM 1 and TM 2:

- *A location that will improve vertical understanding of aquifer system* – A new monitoring well within the Target Area will improve the vertical characterization of the aquifer geometry, aquitard properties, groundwater flow, and groundwater quality.
- *A location that will improve the understanding of horizontal groundwater flow* – A new monitoring well within the Target Area will assist with providing high-quality groundwater-level data, which will improve the understanding of groundwater-level changes, groundwater-flow directions, and the water budget of the Basin.
- *A location that could reveal the existence of barriers to groundwater flow* – A new monitoring well within the Target Area could assist with the identification of currently unknown hydrogeologic barriers to groundwater flow (faults) and/or improve the understanding of groundwater flow across those barriers.

¹ Basin setting refers to the hydrogeologic conceptual model, groundwater conditions, water budget, and description of any designated management areas within the basin.

Figure 1 and Figure 2 show the Target Area identified to address these criteria:

- Figure 1 shows the existing production and monitoring wells in the Spadra Basin, the estimated depth to the bottom of the aquifer, and the location and depth of wells that have been drilled to bedrock. The map shows that the Target Area is located near the Spadra Basin boundary with the Chino Basin, is in the deepest portion of the Spadra Basin where there are no wells that have been drilled to bedrock, and in an area where with no wells screened across the deeper portions of the aquifer system. All of the monitoring wells symbolized as orange squares within the Target Area are monitoring wells (owned by Pomona Calsol Inc.) that are screened across the shallow portions of the aquifer system between 115 and 190 ft-below ground surface (ft-bgs).
- Figure 2 shows the model-estimated groundwater-elevation contours for July 2018 and the associated directions of groundwater flow, and the wells with groundwater-elevation data in 2018 labeled by the measured groundwater elevation in 2018. The map shows that the Target Area is located near the Spadra Basin boundary with the Chino Basin and in an area where there is limited groundwater-level data. In addition, the modeled-simulated groundwater elevations do not match the measured data at the one well in the center of the Target Area (Pomona Calsol Inc. well MW-5 [herein well MW-5]). This general area was identified as the area of greatest uncertainty in the Spadra Basin groundwater model calibration (TM 2). In this area, the model suggests a steepening of the hydraulic gradient towards the Chino Basin, but the measured groundwater elevations in this area do not match the model-simulated elevations as closely as in the other areas of the Basin. These observations suggest the potential existence of an unmapped hydraulic barrier in the area. Currently, there is not enough hydrogeologic data to understand the location and hydrologic properties of the potential barrier.

A well in the selected Target Area will address the criteria listed above to fill the data gap identified in TM 1 and TM 2. Hydrogeologic data at the new monitoring can be used to improve the hydrogeologic understanding of the area and the groundwater-flow model. High-quality groundwater-level and groundwater-quality data collected at the well as part of the monitoring network in the GSP that is necessary for the analysis of groundwater conditions in the Basin and determinations of sustainability.

The process to select potential monitoring well sites within the Target Area is described below.

IDENTIFICATION AND RANKING OF LAND PARCELS WITHIN THE TARGET AREA

Los Angeles County parcel information was obtained within the Target Area to identify potential sites to construct a new monitoring well. Table 1 lists “pass/fail” criteria that were used to identify land parcels that are suitable for constructing a monitoring well within the Target Area. These criteria ensure that (1) there is enough space within a land parcel to accommodate the necessary construction easement and (2) there is enough separation distance between a monitoring well and existing infrastructure.

Table 1. Pass/Fail Criteria for Identification of a Land Parcel for Construction of a Monitoring Well	
Criteria	
The land parcel must have sufficient space to accommodate a 60 ft x 80 ft construction area.	
The land parcel must be 10,000 ft ² or greater to have sufficient space for construction mobilization and traffic	
A monitoring well within a land parcel is at least 500 ft in horizontal distance away from any active well.	
A monitoring well within a land parcel is at least 50 ft in horizontal distance away from any sewer line (sanitary, industrial, or storm; main or lateral). ^(a)	
A monitoring well within a land parcel is at least 100 ft in horizontal distance away from any watertight septic tank or subsurface leaching field. ^(a)	
A monitoring well within a land parcel is at least 150 ft in horizontal distance away from any cesspool or seepage pit. ^(a)	
A monitoring well within a land parcel must have sufficient construction space at least 100 ft in horizontal distance away from an animal or fowl enclosure. ^(a)	

^(a) Distances per the California Department of Water Resources (DWR), Bulletin 74-81 *Water Well Standards: State of California* and supplement Bulletin 74-90

Each parcel in the Target Area was evaluated, and if a parcel did not satisfy all seven criteria in Table 1 it was eliminated from consideration. Figure 3 shows the parcels that satisfied all criteria in Table 1 (i.e. areas that are suitable for construction of a monitoring well).

Table 2 lists criteria that were developed and used to rank the parcels in Figure 3: parcel ownership, current land use, proximity to well MW-5, and location. The purpose of criteria C3 is to use monitoring data at existing well MW-5 in tandem with the monitoring data from the newly constructed monitoring well, to provide cost savings by not having to construct a dual-nested monitoring screened in the upper and lower portions of the aquifer. Well MW-5 with a depth of 175 ft-bgs (screened 132-175 ft-ngs) will provide data on the conditions in the upper portion of the aquifer, and the new monitoring well will provide data on conditions in the deeper portion of the aquifer. In addition, MW-5 is a well that has established Sustainable Management Criteria and will be included in the Monitoring Network for the GSP. The parcels are labeled by their ranking per the criteria in Table 2 below.

Table 2. Land Parcel Ranking Criteria			
Criteria I.D.	Criteria Category	Criteria Weighting Description	Weight
C1	Parcel Ownership	Owned by a Spadra Basin Agency	3
		Owned by another Government Agency	2
		Privately Owned/Other	1
C2	Land Use	Vacant	2
		Developed (e.g. parking lots)	1
C3	Proximity to Well MW-5	Within 0.25 miles	2
		Greater Than 0.25 miles	1
C4	Within Spadra Basin	Yes	2
		No	1

Table 3 shows the results of the parcel identification and ranking for the Target Area and includes information on the parcel ownership and use information. Three parcels (A, B, and C) received the highest-ranking score of nine; two parcels (D and E) received the second highest-ranking score of eight; and one parcel (F) received the third highest-ranking score of seven. These six highest-ranking parcels are shown in Figure 4. Figure 4 shows that all parcels are close to well MW-5 and there are other Calsol Inc. monitoring wells in three of the six highest-ranking parcels (C, D, and E).

Table 3. Land Parcel Information and Ranking										
Parcel Information						Criteria Score				Total Score
Parcel ID	Assessor's ID Number (AIN)	Area (acre)	Parcel Owner	Mailing Address	Use Type and Description	C1	C2	C3	C4	
A	8348-013-901	1.2	City of Pomona	148 N Huntington St	Government Parcel	3	2	2	2	9
B	8348-009-900	0.7	City of Pomona	825 W Monterey Ave	Government Parcel	3	2	2	2	9
C	8348-011-900	1.2	City of Pomona	822 W Commercial St	Industrial - Lumber Yards	3	2	2	2	9
D	8348-013-903	0.7	Redevelopment Agency of Pomona	148 N Huntington St	Government Parcel	2	2	2	2	8
E	8340-032-909	6.1	City of Pomona	628 Monterey Ave	Government Parcel	3	1	2	2	8
F	8348-014-002	1.1	Private	1132 W 1st St	Industrial - Open Storage	1	2	2	2	7

G	8341-007-900	0.3	City of Pomona	401 S Park Ave	Government Parcel	3	1	1	1	6
H	8341-003-900	1.6	City of Pomona	250 S Rebecca St	Government Parcel	3	1	1	1	6
I	8348-019-011	1.0	Private	343 Buena Vista Ave	Commercial - Parking Lots	1	1	1	2	5
J	8340-036-008	1.2	Private	446 W Commercial St	Residential - Five or more apartments	1	2	1	1	5
K	8348-018-058	0.3	Private	1395 W 2nd St	Industrial - Open Storage	1	1	1	2	5
L	8438-019-009	0.3	Private	1303 W Mission Blvd	Commercial	1	1	1	2	5
M	8348-008-062	8.2	Private	1150 W Holt Ave	Institutional - Church	1	1	1	2	5
N	8348-019-010	0.9	Private	3rd St	Commercial - Parking Lots	1	1	1	2	5
O	8348-009-036	1.0	Private	956 W Holt Ave	Commercial - Stores	1	1	1	2	5

WELL DESIGN

Figure 5 shows the preliminary borehole and well design dimensions and details. Final length and depth of the intervals of well casing and screens will be refined based on classification of the soil cuttings, geophysical logs, and other site-specific data acquired during borehole drilling. Figure 5 shows the monitoring well design consists of 4-inch PVC casing with a depth to bedrock of up to 600 ft-bgs.

COST ESTIMATES AND RECOMMENDED NEXT STEPS

The recommended next steps to construct a new monitoring well are:

1. *GSA Decision* – The Spadra GSA decides whether and when to construct the new monitoring well.
2. *Parcel Selection* – Upon decision to move forward with well construction, the parcel owners in Table 3 are contacted to determine their willingness and conditions for monitoring well construction and a permanent easement.
3. *Land Acquisition* – Upon selection of the parcel, and access agreement will be prepared and approved by the parcel owner and the monitoring well owner. All other necessary legal descriptions of the site will be prepared, and construction and permanent easements will be finalized.
4. *Permitting and Compliance with the California Environmental Quality Act (CEQA)* – A CEQA consultant will be retained to prepare the appropriate environmental document. All necessary permits are obtained to construct the monitoring well.

5. *Select the Well Drilling Contractor* – The Technical Specifications and bid package for the construction of the monitoring well are prepared and submitted to prospective contractors. A contractor is selected.
6. *Construct and Equip the Monitoring Well* – The monitoring well is constructed pursuant to the Technical Specifications and is equipped with pressure transducers and other monitoring equipment, as needed.
7. *Prepare Well Completion Report* – A monitoring well completion report is prepared.

The estimated cost to perform steps 4 through 7 outlined above for one monitoring well is about \$370,000 as shown in Table 4 below.

Table 4. Cost Estimate to Construct Monitoring Well				
Subtask to Construct New Monitoring Well	Labor Cost	Travel + Equipment	Sub-Contractor	Total
4. Permitting and Compliance with CEQA	\$2,800		\$5,500	\$8,300
5. Select the Well Drilling Contractor	\$30,800	\$100		\$30,900
6. Construct and Equip the Monitoring Well	\$79,800	\$2,700	\$220,000	\$298,750
7. Prepare Well Completion report	\$28,300			\$28,350
Total	\$141,700	\$2,800	\$225,500	\$370,000
These cost estimates do not take into consideration internal administrative costs such as legal counsel's review of CEQA documentation.				